DOCUMENT RESUME

ED 113 052 PS 008 121

AUTHOR Gottfried, Adele E.
TITLE Effects of Instructions and Stimulus Representation on Children's Selective Learning.
PUB DATE Apr 75
NOTE 8p.; Paper presented at the Biennial Meeting of the Society for Research in Child Development (Denver, Colorado, April 10-13, 1975)

EDRS PRICE MF-$0.76 HC-$1.58 Plus Postage
DESCRIPTORS Attention; *Cognitive Development; *Comparative Analysis; *Elementary School Students; *Incidental Learning; Mediation Theory; *Memory; Pictorial Stimuli; Recall (Psychological)

ABSTRACT

Developmental selective learning processes of elementary school age children were investigated using two types of incidental learning methodologies. The purposes of this study were to: (1) compare the effects of the two types of incidental learning paradigms, and (2) determine the influence of different kinds of stimulus relationships or children's performance at two developmental levels. Eight pairs of colored pictures were presented in each experimental condition. Incidental instructions were varied with respect to the absence vs. presence of a concurrent intentional task. Within both instructional conditions, pairs of stimuli were either conceptual, perceptual, or unrelated. Results showed that selective learning patterns of both younger and older children were significantly modified by type of incidental instruction and type of stimuli presented. Developmental differences were obtained with respect to amount of retention. Instructions omitting a concurrent intentional task were more effective with older children; instructions including a concurrent intentional task were more effective for young children. (Author/GO)

****
* Documents acquired by ERIC include many informal unpublished *
* materials not available from other sources. ERIC makes every effort *
* to obtain the best copy available. Nevertheless, items of marginal *
* reproducibility are often encountered and this affects the quality *
* of the microfiche and hardcopy reproductions ERIC makes available *
* via the ERIC Document Reproduction Service (EDRS). EDRS is not *
* responsible for the quality of the original document. Reproductions *
* supplied by EDRS are the best that can be made from the original. *
****

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

ED113052

EFFECTS OF INSTRUCTIONS AND STIMULUS REPRESENTATION ON CHILDREN'S SELECTIVE LEARNING

Adele E. Gottfried

Abstract

Developmental selective learning processes of elementary school age children were investigated using incidental learning methodologies. The purposes of this study were (a) to compare the effects of two types of incidental learning paradigms, and (b) to determine the influence of different kinds of stimulus relationships on children's performance at two developmental levels. Eight pairs of colored pictures were presented in each experimental condition. Incidental instructions were varied with respect to the absence vs. presence of a concurrent intentional task. Within both instructional conditions, pairs of stimuli were either conceptually-, perceptually- or unrelated. Results showed that selective learning patterns of both younger and older children were significantly modified by type of incidental instruction and type of stimuli presented. Developmental differences were obtained with respect to amount of retention. Instructions omitting a concurrent intentional task were more effective with older children whereas instructions including a concurrent intentional task were more effective for younger children. Interpretation of these findings is made in terms of a production deficiency hypothesis.

Paper presented at the biennial meeting of the Society for Research in Child Development, Denver, April 10-13, 1975.

PS 008121

EFFECTS OF INSTRUCTIONS AND STIMULUS REPRESENTATION ON CHILDREN'S SELECTIVE LEARNING

Adele E. Gottfried

Graduate School of the City University of New York

Paper presented at the biennial meeting of the Society for Research in Child Development, Denver, April 10-13, 1975.

Incidental learning methodology provides an opportunity to investigate the development of selective processes in attention and learning. Since incidental, in contrast to intentional learning occurs in the absence of instructions which prepare the subject for later retention tests (Postman, 1964) a subject has relatively more freedom to choose to attend to and learn only a portion of the presented information, hence exercising selectivity.

Two methodologies, referred to as Type 1 and Type 2 (Postman, 1964), have been used to study incidental learning in children. In the Type 1 design, incidental stimuli are presented without specific instructions regarding retention and without a concurrent intentional learning task. In the Type 2 design, a concurrent intentional task is presented with incidental stimuli. The criteria of incidental learning for Type 1 and 2 designs depends on the particular measures employed, and may include the total amount and type of stimuli learned (Postman, 1964). Therefore, assessment of selectivity in both designs may be multidimensional depending on the type and number of incidental learning measures. Developmental incidental learning studies have focused almost exclusively on selectivity with respect to total amount learned, with increased selectivity an inverse function of total amount of learning. For this latter criterion, Type 1 and 2 methodologies seem to yield divergent developmental trends during the elementary school years. In studies using the Type 1 method incidental learning increased with age indicating a decrease of selectivity with age. On the other hand, in studies using the Type 2 method incidental learning remained stable or decreased with age while concurrent intentional learning increased. For this paradigm incidental learning became proportionately smaller with age indicating increased selectivity.

Since Type 1 and 2 methodologies have not been directly compared in one developmental study, uncontrolled sources of variation between prior Type 1 and 2 studies, such as stimuli and the conditions of presentation, rather than the particular incidental learning methodology employed, may have influenced these developmental trends. The purposes of the present study were: (a) to assess the relative effects of Type 1 and 2 methodologies on developmental selectivity trends through a direct comparison of these designs, and (b) to elucidate developmental processes influencing children's selective learning relative to these designs. For this latter purpose, children's selective learning of stimuli corresponding to different levels of cognitive representation (i.e. conceptual vs. perceptual vs. rote) was investigated. Since selectivity is assessed through

30003

retention task performance, the type of mental representation employed by children of different ages might be expected to significantly influence selective learning in both Type 1 and 2 designs. This has not been investigated in earlier studies.

Older children were expected to use conceptual representation more successfully than younger children to encode stimuli in response to Type 1 or 2 instructions, and were also expected to differentially learn stimuli varying in type of representation (conceptual, perceptual or unrelated) more successfully than younger children. Therefore, it was hypothesized that older children are more flexible in exercising selectivity than younger children. Selective learning patterns of more flexible subjects were expected to show greater variation in response to instructional and stimulus conditions than those of less flexible subjects. Specifically, selective learning patterns of older children were expected to be significantly modified by both the type of incidental learning paradigm and type of stimuli presented, whereas selective learning patterns of younger children were expected to be equivalent regardless of instructions and stimuli. To test this hypothesis, a three-way factorial design was employed using (a) type of incidental learning paradigm (Type 1 vs. 2), (b) stimulus representation (conceptually-, perceptually- or unrelated), and (c) developmental level (first- and sixth-graders).

Method

Subjects were 168 white, middle class children who were randomly assigned to the experimental conditions. An equal number of first- and sixth-grade girls and boys were employed.

Eight pairs of colored pictures were presented in each condition. The same 16 stimuli were used in all conditions, but were paired either conceptually, perceptually or in an unrelated manner. Each stimulus was approximately 2 in. (.05 m) in height and width, and was centered on a 3 in. (.076 m) white square. Each pair of pictures was centered on a separate sheet of white, standard size typing paper with one picture placed directly above the other. The individual top and bottom stimuli were the same for all conditions. Stimulus sets were placed in one of three separate, flexible-covered looseleaf binders for presentation to children in the assigned condition.

Criteria specified by Olver and Hornsby (1966) for types of equivalence were used to develop conceptually- and perceptually-related pairs. Pairs were not associatively related as determined by the Entwisle (1966) and Palermo and Jenkins (1964) word association norms for elementary school children. Examples of stimulus pairs are flower-tree, egg-face (oval), and car-egg which were in the conceptual-, perceptual- and unrelated-stimulus conditions respectively. Pretests determined that stimuli were easily recognized and nameable by all children, and that the pairs conveyed intended relationships.

In the Type 1 condition children were instructed to look at the pictures but were not informed that they would receive later retention tasks. In the Type 2 condition children were instructed to look at all stimuli and to remember the top member of each pair for later retention. Immediately following stimulus exposure, free recall and matching of pairs (recognition) tasks were administered.

Dependent measures were: total amount, number of top and bottom stimuli, the proportion of top to total stimuli, and the total number of pairs correctly matched. The proportion measure was particularly important since it provided information about the pattern of top to total recall between conditions and grades regardless of the total amount of recall.

Each child was seen individually. Pairs were exposed for 10 seconds each. After each 10 second period, the child was told to turn to the next pair.

Results

Analysis of variance (Grade X Type of incidental learning paradigm X Stimulus representation X Sex) was conducted on each of the dependent variables. Results revealed that selective learning patterns of both age groups were significantly and similarly modified by instructions and stimuli. Means for all variables grouped by Grade and Type of incidental instruction are presented in Table 1. For both first- and sixth-graders: (a) incidental learning as measured by matching of pairs and number of bottom stimuli recalled was significantly greater for children in Type 1 compared to those in Type 2 conditions, $p<.001$ for both ; (b) recall of the top (intentional) stimuli was significantly superior for children in Type 2 compared to those in Type 1 conditions, $p<.001$; (c) the proportion of top to total recall was significantly greater in Type 2 compared to Type 1 conditions, $p<.001$; and (d) matching retention of children in perceptual conditions was significantly greater than that of children in conceptual conditions, whose retention was significantly greater than that of children in unrelated-stimulus conditions, for all Tukey pairwise comparisons of marginal means $p<.01$. These latter trends are illustrated in Figure 1.

Developmental differences which were obtained were related to the absolute amount rather than the pattern of retention. Older children showed significantly higher levels of retention than younger children on all measures, $.01>p<.001$, except for the proportion of top to total stimuli. Grade differences were not obtained for this latter measure, $p=.43$. Therefore, despite superior absolute levels of retention for sixth-graders, younger and older children exhibited the same pattern of selectivity relative to Type 1 and 2 instructions. Instructions did, however, differentially influence first- and sixth-graders' amount of recall for total amount and number of bottom stimuli as revealed by significant Grade X Type of incidental paradigm interactions, $p<.001$ for both. Type 1 instructions enhanced sixth-graders' recall of bottom stimuli to a significantly greater extent than for first-graders. On the other hand, Type 2 instructions enhanced first-graders' total amount of recall to a significantly greater extent than did Type 1 conditions, while sixth-graders' total amount of recall was equivalent under both Type 1 and 2 conditions. Means are presented in Table 1. There were no other differences attributable to grade.

Discussion

Selectivity, as assessed by learning pattern, did not increase or decrease with age but was related to experimental conditions for all children. The similarity of first- and sixth-graders' learning patterns indicated that younger and older children were equally flexible with regard to instructions and stimulus representation conditions. Where developmental differences occurred they indicated that structured conditions enhanced younger children's total amount of recall to a

greater degree relative to that of older children, while nonstructured conditions enhanced older children's amount of bottom stimuli recalled to a greater extent than for younger children. These results are interpreted according to a production deficiency theory of memory development. Compared to younger children, older children are viewed as production efficient in ability to produce stimulus mediators and impose organization in nonstructured tasks, and regardless of the presence vs. absence of an intentional task. On the other hand, younger children are likely to produce mediators to a much greater extent when intentional instructions are administered than when they are omitted. Thus, relative to older children, younger children are production deficient in nonstructured incidental learning tasks.

The divergent developmental trends found in previous Type 1 and 2 studies were apparently due to the diverse tasks and stimuli used between studies rather than to the intrinsic nature of Type 1 and 2 methodologies since the present study found that incidental learning increased with age in both Type 1 and 2 designs. However, Type 1 and 2 paradigms did differentially influence the pattern of performance of all children. For the Type 2 task, activities associated with memorizing the top stimuli, such as stimulus naming, may have interfered with learning incidental stimuli and the relationships between intentional and incidental stimuli. For Type 1 instructions, since an interfering concurrent intentional task was absent, children were free to observe and/or code both the top and bottom stimuli and relationships between pair members.

The results also suggest that perceptual aspects of stimuli are more readily learned than conceptual relationships in incidental tasks. Retention of conceptual pairs may have been inferior to that of perceptual pairs since knowledge of the former pairs required inferences beyond the given physical characteristics. Inferential cognitive analysis may have been diminished by a limited period of stimulus exposure and/or the absence of an instruction to learn the pairs. Learning of conceptual and perceptual stimuli in intentional and incidental tasks should be compared.

Since older and younger children evidenced equivalent selective learning patterns regardless of the absolute amount of learning, this latter criterion is of dubious value in studying selective processes developmentally. Rather, developmental patterns of learning particular stimuli regardless of amount of retention should be the major criterion of selectivity in future studies. Amount of learning may then provide supplementary information as to the influence of specific tasks on retention strategies employed by children of different ages which modify the quantity of performance.

References

Entwisle, E. Word associations of young children. Baltimore: The Johns Hopkins Press, 1966.

Olver, R. R., & Hornsby, J. R. On equivalence. In J. S. Bruner, et al., (Eds.), Studies in cognitive growth. N.Y.: Wiley, 1966.

Palermo, D.S., & Jenkins, J. J. Word association norms: Grade school through college. Minneapolis: U. of Minnesota Press, 1964.

Postman, L. Short-term memory and incidental learning. In A. W. Melton (Ed.), Categories of human learning. N.Y.: Academic Press, 1964.

Table 1

Means for Dependent Measures Grouped by Grade and Type of Instruction

Group	Total Amount of Stimuli	Number of Top Stimuli	Number of Bottom Stimuli	Proportion of Top to Total Stimuli	Number of Correctly Matched Pairs
	Measures				
Grade 1					
Type 1	4.92	2.66	2.26	.54	4.56
Type 2	6.28	4.59	1.66	.73	2.70
Grade 6					
Type 1	9.16	4.46	4.69	.48	5.75
Type 2	8.59	6.49	2.09	.76	3.33

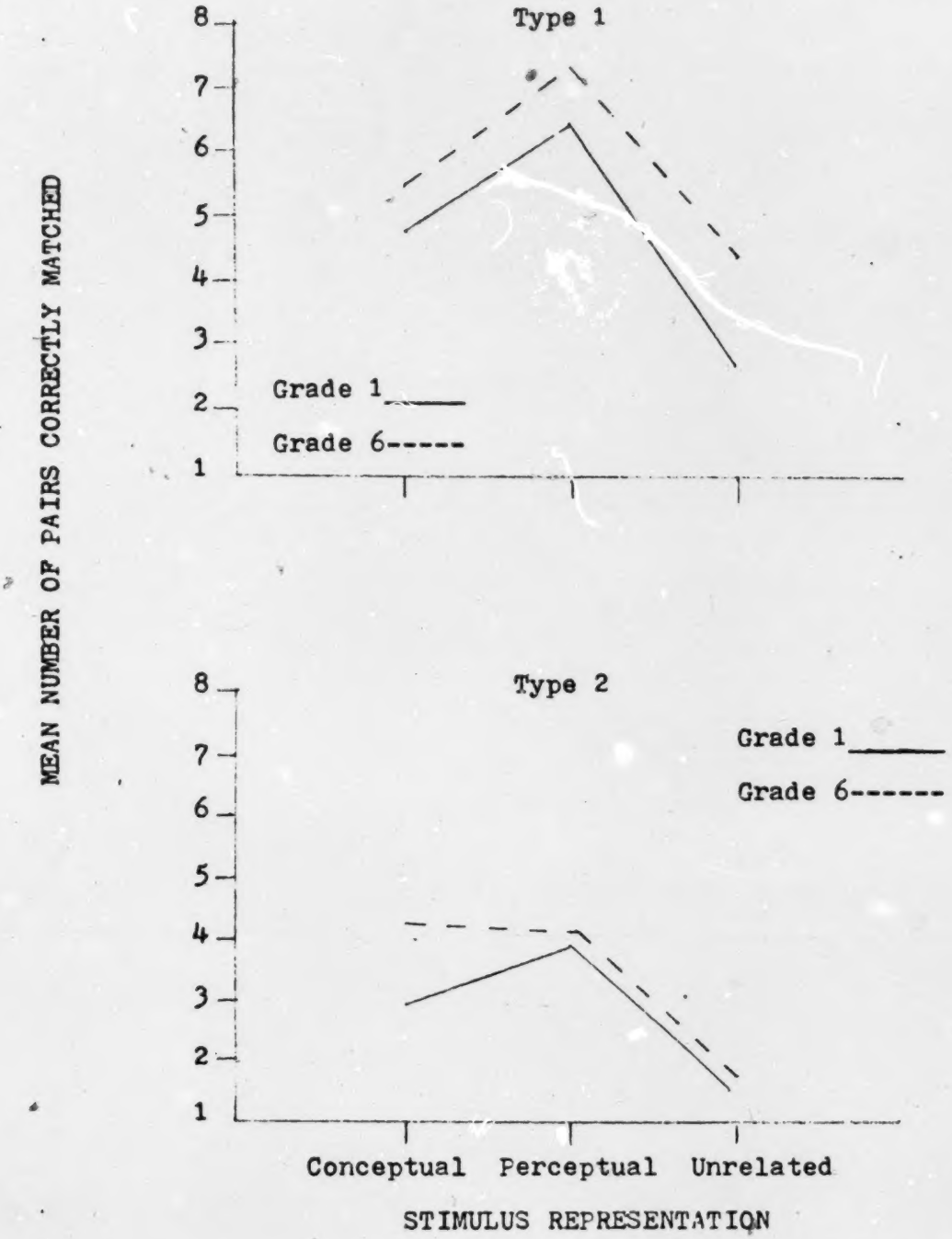

Figure 1. Main effects for grade, type and stimulus: Total number of correctly matched pairs.